The Efficacy of Vision Training in Collegiate Baseball Hitting Performance

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Abstract

There has been a surge of research on vision training and its implications in a sports setting over the past decade. A large body of research is available on the implementation of ophthalmology-based vision training exercises for athletes and performance on a standardized task that tests eye-hand coordination through a sport-specific skill. However, there remains a gap in the literature on the implications of vision training for on-field performance. To help fill this gap, the present study examines the efficacy of a vision training on hitting performance through a pitching simulation that approaches game-like with the Northwestern College Varsity Baseball Team. Hitting performance of the Varsity and Junior Varsity control groups was first assessed with 40 pitches thrown by a pitching machine followed by a 9-week vision training program including a battery of vision training exercises performed by Varsity hitters. Following the training program the hitters were retested and results of the Varsity and Junior Varsity control groups were analyzed. The present research adds to the small body of research investigating the impact of vision training for on-field performance benefits secondary to improvements in eye-hand coordination that occur by taking part in a vision training program.

Figure 1: Testing Set-up

Figure 2: Brock String with Ruler

Figure 3: Brock String with Ruler

Premise of Vision Training in Baseball

The premise of vision training in baseball is that vision can be trained. These improvements may then lead to increased performance secondary to enhanced eye-hand coordination. Increased performance through vision training occurs not by physical means, but rather through improved efficiency of the ocular system that perceptually slows the ball down. This perceived decrease in pitch velocity thus would increase the amount of time for the batter to collect perceptual information so they can better track the ball from the pitcher's hand to the contact with the baseball bat. A player may do this by multiple mechanisms that indicate greater eye efficiency including seeing the pitch coming out of the pitcher's hand with greater acuity, accurate detection of the direction and rate of spin on the ball, and tracking the ball on its trajectory with greater acuity. By performing any of these visual skills more efficiently a batter can better predict when and where the ball will pass over the plate allowing for a more effective motor response to the pitch.

Introduction

Becoming a successful baseball hitter requires speed, strength, and eye-hand coordination for a swing that is spatially and temporally precise. Speed and strength are trained through resistance training but the eye-hand coordination required to put the ball into play has been overlooked until recently. Vision training programs have been developed to address eye-hand coordination in baseball by increasing the efficiency of eye function (1,2,3). Operating under the construct that the eyes can be improved through optometry-based exercises, vision training programs are now being used by collegiate and professional baseball teams across the country, though much of the benefits are still anecdotal. The goal, therefore, of this study is to test the impact of a vision training program on hitting performance in collegiate baseball players.

Currently there are two problems in the field of vision training, both of which this study looks to address. The first problem is the conflicting evidence on the efficacy of vision training in improving performance in sports. There is general support for vision training and its enhancing effects on sports performance (1,2,3). However, an influential article assessing a vision training program in racquet sports that showed no significant differences between groups has brought vision training into question (8). No matter whether there is general support for or against vision training, there remains controversy so this study aims to strengthen the present body of research so conclusions on the effects of vision training on sports performance can be drawn with greater confidence.

The second, and more recent, problem in the field of vision training is the question of transfer to a game. The general support, though still controversial, shown by foundational studies in vision training have spurred researchers to gravitate toward game-like settings to determine how vision training will impact in-game sports performance. The already small body of research on vision training in sports shrinks further when looking for studies that look into in-game performance effects of vision training. These effects are relatively unknown so this study aims to add to the new body of research that investigates in-game performance benefits of vision training.

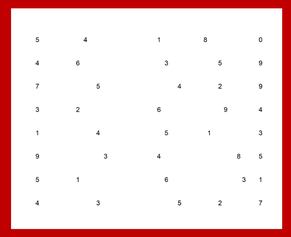

Figure 4: King-Devick Test

Figure 5: Vision Training Set-up

Methods

- Subjects: Northwestern College baseball hitters
  - Groups selected by team they hit for
    - Varsity=experimental group
    - Junior Varsity=control group
- Instrumentation:
  - Dartfish camera system for video collection
  - Baseball pitching machine
  - Vision training exercises
    - Brock String (figures 2 and 3)
    - Saccadic eye movements with King-Devick test (figure 4)
    - Wall saccades (figure 6)
    - Near-Far training (figure 7)
- Procedure:
  - IRB submission and informed consent
  - Pretest measuring hitting performance via hitting percentage and exit velocity
    - Varsity: 40 pitches at 85 mph, medium spin
    - Junior Varsity: 40 pitches at 80 mph, medium spin
  - Vision Training Program for 18 sessions
  - Posttest following the same procedure as pretest
    - Varsity: 40 pitches at 88 mph, medium spin
    - Junior Varsity: 40 pitches at 83 mph, medium spin
  - Interpretation of data to determine effects of the vision training

Figure 6: Wall Saccades

Figure 7: Near-Far Training

Sources

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